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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/591,437      | 06/09/2000  | Jiuzhi Xue           | DIS-P016            | 3249             |

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EXAMINER

DUONG, THOI V

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2871

DATE MAILED: 02/15/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/591,437

Applicant(s)

XUE ET AL.

Examiner

Thoi V Duong

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period of Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 09 June 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-22 ~~is~~ are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-22 ~~is~~ are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claims 1, 13 and 14, it is unclear the means for securing the first substrate with respect to the second substrate consists of which elements. Similarly, with respect to claims 10 and 13, it is unclear the means for electrically addressing the optical device consists of which elements. The specification does not disclose those means recited in the claims. Also, claims 2 and 15 are inconsistent with the specification disclosure wherein the ferroelectric liquid crystal material has a phase sequence of Isotropic - Chiral Nematic – Smectic A – Smectic C\* - Crystalline. Finally, the remaining claims are also rejected since they depend on the indefinite claims. In the below prior art rejection, the means for securing is broadly interpreted as the perimeter sealant and the means for electrically addressing is broadly interpreted as the drive circuit and the electrodes.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Bos (USPN 4,900,132).

As shown in Figs. 1 and 2, Bos discloses an optical device 10 including a ferroelectric liquid crystal material 16 captured between a pair of electrode structures 12 and 14 which include a first substrate 18 and a second substrate 18' respectively. Each substrate has on its inner surface a layer (20 and 20' respectively) of electrically conductive but optically transparent material such as indium tin oxide (col. 4, lines 5-8 and lines 15-20). The ferroelectric liquid crystal material is of a type that exhibits in a phase sequence of Isotropic - Nematic - Smectic A – Smectic C\* - Crystalline states at successively lower temperatures (col. 2, lines 50-53) and has a cone angle of 15 degrees (col. 3, lines 64-67). The device also includes a first alignment treatment 22 applied to a surface of the first substrate, said first alignment treatment being intended to induce an orientation of at least a portion of said ferroelectric liquid crystal material along a first alignment direction with a first pretilt angle (+ $\theta$ ) with respect to a plane parallel to said first substrate; a second alignment treatment 22" applied to a surface of the second substrate, said second alignment treatment being intended to induce an orientation of at least another portion of said ferroelectric liquid crystal material along a second alignment direction with a second pretilt angle (- $\theta$ ) with respect to a plane parallel to said second substrate (col. 4, lines 51-65). The surfaces of the first and second substrates onto which the first and second alignment treatments were applied, respectively, are spaced apart, generally parallel and facing each other by a perimeter sealant 26. Bos further discloses that the absolute values of pretilt angles are typically

between about 5 and 45 degrees (col. 5, lines 22-23) and hence a projection of the first alignment direction onto the treated surface of the first substrate makes a non-zero angle with respect to a projection of the second alignment direction onto the treated surface of the first substrate. The liquid crystal device in his invention is substantially free from smectic plane alignment defects (col. 2, lines 39-41) and typically functions as a bistable device having two optical states that are characterized by different orientations of the optic axis (col. 3, lines 4-7). Since the liquid crystal device of Bos has similar structure with the instant invention, his device is inherently free of chevron structures without a need to otherwise apply an additional treatment to the optical device.

As shown in Fig. 4, the optical device further comprises a light gate 40, which receives light rays 54 emanating from a light source and incorporates the optical device in such a way that the optical device in turn produces a light output of a particular optical state (col. 5, lines 41-52), and a drive circuit 25 for electrically addressing said optical device in such a way that the particular optical state of the light output is continuously variable between a minimum optical state and a maximum optical state (col. 6, lines 20-38). During said continuous variation of the optical state of the light output, an optical retardance of the optical device remains generally constant (col. 5, lines 53-61 and col. 10, lines 14-16).

As shown in Fig. 2, the first and second alignment treatments 22 and 22' provide strong molecular anchoring of at least portions of the ferroelectric liquid crystal material located immediately adjacent to the surface contacting directors 28 and 30 (col. 4, lines

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65-68 and col. 5, lines 1-5). Bos finally discloses that the first and second alignment treatments are specifically chosen so as to specifically induce pretilt angles  $+\theta$  and  $-\theta$ , respectively, and include a coating of a predetermined direction silicon monoxide or another alignment material on conductive layers 20 and 20' in Fig. 1. Methods for depositing silicon monoxide or other alignment materials to align liquid crystal directors in a pre-determined direction have been disclosed previously by others and are known to those having ordinary skill in the art (col. 5, lines 30-40).

**Conclusion**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication should be directed to Thoi V. Duong at telephone number (703) 308-3171.

Thoi Duong

02/11/2002



William L. Sikes  
Supervisory Patent Examiner  
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